

NOAA REPORT



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Nancy Foster visits a friend at the National Aquarium in Baltimore, Md.

Tributes to Nancy Foster

eath dimmed a shining star in the NOAA family on June 27 when Assistant Administrator Nancy Foster Geraci passed away following a long illness.

A longtime NOAA employee, she was as highly regarded as a kind, understanding and uncommonly personable human being as she was respected as a scientist, manager and public servant, as reflected in the many tributes to her received by the NOAA Report.

Following are excerpts from a few of these tributes.

Joseph Geraci, husband of Nancy Foster "There's a side to continued on page 2

NOAA Scientists Take the Next STEPS in Thunderstorm Studies on the Great Plains

-By Andrew Freedman **T**hen a violent thunderstorm V threatens, it's a good idea to seek shelter immediately. But for a team of scientists on the Great Plains this spring, just the opposite was true. They actually went to great lengths to put themselves in the path of developing thunderstorms, all for the sake of improving forecasts of this violent weather.

From May through early July, scientists in cars and vans with meteorological instruments mounted on their roofs converged on storms in northwest Kansas, eastern Colorado and southwest Nebraska to take close-up measurements. The project is STEPS, short for the Severe Thunderstorm

Electrification and Precipitation Study, which united NOAA scientists with colleagues from universities around the country.

This tri-state region experiences the highest rates of low precipitation supercells and positively charged lightning strikes in the country, weather phenomena of utmost interest to STEPS scientists.

Thanks to improved technology and research data from previous storm studies, STEPS researchers were able to focus on the mechanisms behind electrification and precipitation. For the first time, they were able to collect a comprehensive data set on a lowcontinued on page 7



Michael Leonard/CIMMS

Scientists stretch their legs during a break from chasing thunderstorms across the plains.



Nancy Foster

continued from page 1 Nancy that her colleagues at NOAA might not know. Animals comforted her. She loved dogs, and never had fewer than two. We would visit state fairs and spend most of our time in the grooming barns, just observing nursery pens—calves, piglets, lambs and ducklings. As easily as she would stroke a cat or feed a squirrel in the park, Nancy would coax a spider onto a dish and place it in a protected spot of the garden. Her love of life was truly undivided. She couldn't watch me prune a hedge, or permit me to cut down a dead tree. She just venerated life."

Scott Gudes, Assistant Secretary for Oceans and Atmosphere:

"Simply put, Nancy Foster was a powerful force for good in this world. Nancy had a way of looking out for those who needed it most. She and her husband, Joe, shared a commitment to protecting marine mammals and preserving the marine environment. NOAA and this nation's environment lost a legendary leader. Many of us lost a friend and role model too. Nancy Foster will be greatly missed."

Rolland A. Schmitten, Deputy Assistant Secretary for International Affairs: "Nancy Foster was THE most important person involved in shaping and guiding my career. We were always a team, and I relied on her advice for more than 16 years. Her passing is a tragic loss to both scientists and species in the marine world. More than anything else, Nancy was my friend, and I will sincerely miss her."

Diana Josephson, former Deputy Under Secretary: "I was always very impressed by Nancy's commitment to the issues she worked on and to the people in general who worked with and for her. Nancy always actively sup-



Juan Tricoche/DOC

Nearly 300 members of NOAA's "Running With the Currents" team participated in the Washington, D.C., leg of the National Race for the Cure, including Sandy Cobb (center with team sign), father of longtime NOAA employee Nancy Cobb, who died of breast cancer this spring. In the Hampton Roads, Va., area, 14 NOAA employees raised over \$6,200 in a local leg of the American Cancer Society Relay-for-Life.

ported the creation of an atmosphere in NOAA where everyone is accorded full respect and can realize their full potential. Nancy was very professional and easy to work with. And through our work together we became friends."

Penny Dalton, NOAA Fisheries Assistant Administrator: "Nancy was an amazing woman who balanced many roles—scientist, environmentalist, manager, mentor and friend—with humor, intelligence and great skill. Her death is a huge loss for NOAA and for all of us who loved and respected her."

Andy Rosenberg, NOAA Fisheries Deputy Assistant Administrator: "Nancy Foster was a mentor to me and many other people in NOAA. She truly cared about people and the work we do. She had a major impact on my life and career and I'll never forget her."

John J. Kelly, Jr., Assistant Administrator for Weather Services: "This summer vacation at the ocean, I invite you to remember Nancy Foster and her commitment to protecting the oceans and coastal areas that she loved and served so well."

Bill Thomas, University of Hawaii: "I, like everyone else, am deeply saddened, especially since she's the one who really gave me the chance to do a number of things during my tenure in Sanctuaries. The confidence she showed in me and the professional growth I experienced while in D.C. can be attributed directly to Nancy. I still think of her often—that will never stop—and will always be grateful for her years of undying support."

Gregory W. Withee, Assistant Administrator for NESDIS: "It is with a distinct sense of both personal and professional loss that we acknowledge the passing of Nancy Foster. We knew Nancy as a dedicated and talented NOAA program manager and we celebrated her appointment as Assistant Administrator. She was a valuable member of the NOAA family and we have lost one of our best."

Capt.Ted Lillestolen, Nancy continued on page 8

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President Clinton Announces

NOAA to Lead Ocean Exploration Expeditions

-By Patrick Lane

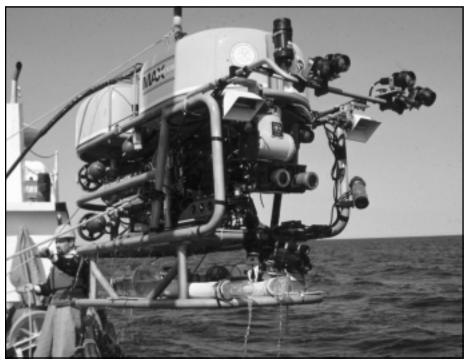
With an audience of ocean explorers and scientists in attendance at the White House June 12, President Clinton recalled past expeditions into the unknown in calling on NOAA to lead the nation in a new era of deep-sea exploration.

At the ninth White House millennium lecture, entitled "Exploration: Under the Seas and Beyond the Stars," the President directed NOAA to work with private sector research organizations and universities to push back the frontier beneath the surface of our oceans by conducting a series of subsea exploratory expeditions beginning this year.

"More than 95 percent of the underwater world remains unknown and unseen. What remains to be explored could hold clues to the origins of life on Earth, to links to our maritime history, to cures for diseases," the President said.

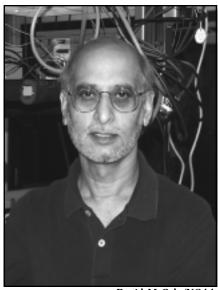
"We must continue as a nation to set out for new frontiers, whether under the sea or into the heavens," the President said. "We must continue to try to conquer the seemingly impossible, to discover the unimaginable, to find out more about what's out there, and in the process, about ourselves and what's here."

The President directed NOAA to lead expeditions this year to continued on page 8



Peter Auster/NURC UCONN

The President has directed NOAA to lead expeditions this year to explore the Davidson Seamount off California, the deep sea vents in the Gulf of Mexico off Florida and the Hudson Canyon off New York and New Jersey with undersea vehicles such as Kraken (pictured), operated by the North Atlantic and Great Lakes National Undersea Research Center.



David McCabe/NOAA

Akkihebbal Ravishankara.

NOAA Scientist Named to National Science Academy

Akkihebbal Ravishankara, a senior scientist and atmospheric chemist at NOAA's Aeronomy Laboratory in Boulder, Colo., has been elected a member of the U.S. National Academy of Sciences.

Ravishankara is the leader of the Atmospheric Chemical Kinetics Program at the laboratory.

Election to the academy, one of the highest honors that can be accorded a U.S. scientist, recognizes distinguished and continuing achievements in original research.

Ravishankara's studies have advanced our understanding of basic chemical processes related to several major environmental issues, including ozone-layer depletion, climate change and air pollution. He has also developed new approaches to studying the chemical reactions that can occur on the surfaces of particles in the upper and lower atmosphere, results which have led to a better understanding of the chemistry that causes the Antarctic ozone hole.

Focus On...

Lightning Safety

Lightning is the second deadliest form of violent weather in the United States, causing approximately 100 deaths and upwards of 500 injuries each year. (Flash floods are the number one killer.)

All lightning strikes can kill people.

On average, there are nearly 22 million cloud-to-ground lightning flashes each year in the United States, making lightning the most commonly encountered weather hazard.



C. Clark/NOAA

Although the greatest danger from lightning is during thunder storms, the seemingly random nature of many lightning strikes makes it extremely difficult to issue specific warnings.



NOAA Photo Library

Reducing the Risk of Lightning

Lightning danger can be reduced by taking a few simple steps.

Listen to NOAA Weather Radio or television or radio weather reports for severe storm watches and warnings. If you can see lightning or hear thunder, you are already at risk.

Although no place is absolutely safe from lightning, during a thunderstorm people should seek shelter in the interior of a house or other enclosed, substantial building, the larger the better.

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Courtesy of Jim Reed Photography

More Lifesaving Lightning Tips

Adults should take responsibility for children during thunderstorms and accompany them indoors at the first sign of storm activity.

Cars, trucks and other enclosed vehicles are generally safe havens from lightning if contact with metal surfaces is avoided. Convertibles and golf carts are not safe.

When indoors during storms, avoid contact with telephones, running water and plumbing fixtures, metal doors and window frames, television cables and any other wires or surfaces that could conduct electricity.

If it is not possible to move indoors, avoid water, high elevations, open fields, tall and isolated trees, open picnic shelters, poles and towers, bleachers and dugouts, metal fences and any metal structure that could conduct electricity. If in a boat on the open water, come ashore at the first sign of a thunderstorm.

If lightning is occurring in the immediate vicinity and you cannot reach shelter, stay away from tall and metal structures, crouch down in a ditch, depression or other low point and minimize body contact with the ground.

Studying Lightning Safely

Even when NOAA scientists intercept thunderstorms to study them, safety remains a primary concern. While launching weather balloons during thunderstorms, National Severe Storms Laboratory researcher David Rust says, "In the field, we are always monitoring the lightning activity as we get ready to fly balloons. We do sometimes abort a balloon launch and move ourselves into the safety of vehicles until a lightning hazard has diminished."

For more information about lightning and other severe weather, go to http://www.nws.noaa.gov or http://www.nssl.noaa.gov.



C. Clark/NOAA

Miles Lawrence: Hurricane Man

—By Frank Lepore

This is the seventh in a series of profiles of men and women who have been NOAA employees since NOAA was established in 1970.

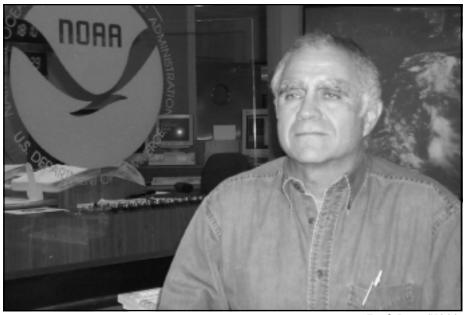
any National Weather Service hurricane advisories end with the notation "Lawrence," the moniker of Miles Lawrence, senior hurricane specialist at the Tropical Prediction Center-National Hurricane Center in Miami, Fla.

With a few keystrokes, Lawrence completes a time-honored National Weather Service tradition every time a hurricane threatens—signing his work. The Lawrence "signature" punctuates a history of some of the nation's worst hurricanes: Eloise, David, Frederic, Allen, Alicia, Elena, Gloria, Gilbert, Hugo, Andrew, Erin, Luis, Opal, Fran, Mitch and Lenny.

Emergency management and international meteorological officials who rely on these advisories stand sentry protecting some 64 million U.S. coastal residents and additional millions in the Caribbean. Some take special notice just seeing Lawrence's name.

Along with five colleagues working in shifts, Lawrence looks into the future to forecast the 72-hour track and intensity of any tropical storm in his area of responsibility. No small task this, for the area extends from Africa to east of Hawaii. Such forecasts may be in unbroken continuity this year, with above average activity predicted for the Atlantic hurricane season already underway.

Lawrence works in smooth coordination with the meteorologist whose shift preceded his. Hurricane advisories are perishable products and are re-issued every six hours. The next forecaster, in turn,



Frank Lepore/NOAA

With 40 years of experience, Miles Lawrence is the "meteorological patriarch" of the National Hurricane Center.

will sign his own work. There's obvious pride in authorship.

"Ninety-nine percent of the time, the forecast is routine," Lawrence notes with characteristic understatement.

"One simply 'nudges' the forecast made by a colleague, keeping the ship on the set course. It's the 99 percent of the time that enables me to respond to the one percent that isn't routine,"

Lawrence adds.

"That one percent includes unexpected and unprecedented changes that occur in the weather. The task then very quickly shifts to saying what's happening so the information will be useful," he says.

Lawrence's expertise as the National Hurricane Center's senior hurricane specialist spans the introduction of geostationary satellites, the modernization of the National Weather Service and the era of high tech communication via the Internet.

"Because the National Weather Service has given us the technical wherewithal to do it right, we continue the tradition of excellence begun by Grady Norton, the National Hurricane Center's first director, in 1943," Lawrence says.

When viewed in retrospect, it is a mind-challenging array of technology to master.

"My experience with technological tools-of-the-trade literally goes from Teletype, hand drawn maps and fax machines to computers, numerical models and satellites. It is an understatement to say that technology has changed forecasting," Lawrence says.

The technology of our age helps reduce uncertainty; but it doesn't eliminate it. "There will always be a person in the loop," says Lawrence, "someone to oversee the data pouring in from satellites, reconnaissance aircraft, radar, surface observing systems, numerical models and the like. Even with the precision of these inputs, there will be times when science melds with skill, a feeling in the gut, a decision based on experience."

Lawrence started his weather career in 1960 when the U.S. Air Force sent him to the Massachusetts Institute of Technology for graduate training in meteorology.

He was then a weather officer at continued on page 7

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Lawrence

continued from page 6 Plattsburgh Air Force Base, where he briefed Strategic Air Command bomber and tanker pilots.

A brief stint followed with IBM, analyzing the U.S. Weather Bureau's computer needs and forecast operations. His study contributed to the reorganization of the Weather Service forecast offices, a forerunner to later modernization and restructuring of the service.

Lawrence started with the National Hurricane Center in 1966, preparing tropical weather discussions, those narrative descriptions which give the forecaster's rationale for why the forecast is the way it is.

Next he devoted several years as a research meteorologist assisting in the development of the first statistical-dynamical track models used by the center to help predict the future path of tropical cyclones.

A hurricane specialist since 1974, he is now a meteorological patriarch, of sorts. His wisdom, and willingness to impart his experience to those up-and-comers, coupled with a show-me skepticism, make him an ideal mentor. He has the perspective of those that have made, and survived, the long march.

Miles Lawrence sums the life of a hurricane specialist this way: "I've met truly dedicated people in the meteorology and emergency management business over the last 36 years. One of the best parts of our job is reaching out to those who use our forecasts—hearing what they have to say, how they were impacted, what we did right, and yes, what we did wrong. Such feedback is exhilarating as well as humbling, because you made a difference in people's lives.

"It's been a wonderful career and it's not over yet." 🔊



Andrew Freedman/NOAA

Scientists and meteorology students prepare to launch a weather balloon from its mobile carrying case during STEPS.

STEPS

continued from page 1 precipitation supercell, a type of storm known for producing an unusual amount of positively charged lightning strikes, as well as large hail and tornadoes.

The concentration of government and university research assets in STEPS, which was partially funded by the National Science Foundation, was extraordinary. While researchers were launching balloons and taking measurements on the ground, a T-28 armored aircraft from the South Dakota School of Mines and Technology flew through the thunderstorms collecting data on cloud particles and the electric field.

David Rust and Don MacGorman of NOAA's National Severe Storms Laboratory led the electrification component of the study. They and their crew of university meteorology students launched specially outfitted balloons into different quadrants of thunderstorms to obtain a thorough picture of their electrical characteristics. On June 3, they obtained the first ever sounding through a low precipitation thunderstorm. Preliminary results from this and other storm encounters have yielded tantalizing clues into the electrical structure of thunderstorms, the scientists say.

Rust and his colleagues have also discovered storms with an "inverted" polarity structure. These rebels have positively charged areas located near the ground, while the upper reaches of the storm are negatively charged, the reverse of normal storm structure.

A key question facing forecasters is whether there is a correlation between lightning polarity and thunderstorm severity. That is, if a thunderstorm switches from negatively charged cloud-to-ground strikes to positively charged ones, does that mean that the storm is intensifying and may be producing a tornado? Is there an association between positive cloud to cloud flashes and large hail? Such linkages, the scientists say, could improve severe weather warnings.

Foster

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Foster's deputy at the National
Ocean Service and a longtime
colleague: "Nancy was a pioneer.
Early in her career she had an
appreciation of the importance of
ecosystem management and marine
protected areas. She was truly a
visionary, enabling NOAA to enter
the 21st century as the nation's
leader in marine conservation and
coastal stewardship."

Rear Adm. Evelyn J. Fields,
Director, Office of Marine and
Aviation Operations: "Over the
years, Nancy has been a role model
and mentor for me. Her two
greatest passions were to support
her employees and bring out the
best in them, and to protect our
nation's natural resources. Her
ability to balance the two in doing
the work of NOAA was extraordinary. Losing her is a great loss to
NOAA, and to me as a colleague, a
friend and a mentor."

Herbert Kaufman, Chief, NMFS Planning and Development Division: "Nancy was the most influential woman in the federal work force that I've ever had the opportunity to know. As a boss she was a true leader, not a taskmaster but someone who understood people. She had a keen sense of how an employee might contribute and was a master at making an individual feel confident, productive and important regardless of their grade. Nancy was a positive force whom everyone respected and loved dearly. She taught us how to work hard, help ourselves and at the same time, be kind to our fellow employees. She was respected by all and will truly be missed by everyone."

Ernest F. Hollings, United States Senate: "Mr. President, it is with the most heartfelt sadness that I rise today to commemorate the life of Dr. Nancy Foster, who passed away Tuesday at her home in Baltimore, Md. As I stand here today I recall that only a year ago I spoke to you about Dr. Foster's outstanding work as head of the National Ocean Service at NOAA. The news of her passing was a bitter pill. Not only was Dr. Foster a dedicated and visionary public servant, but she was also universally admired and loved. I know that her creativity, boundless energy and compassion will be sorely missed both here and at NOAA. Dr. Foster's efforts in my home state of South Carolina both as head of NOS and then at NOAA's Fisheries Service were testaments to her skill at bringing groups together to solve incredibly complex coastal problems, from protecting our sea turtles to conserving and understanding our precious coastal resources. The world is a better place for her having served here with us."

D. James Baker, Under Secretary for Oceans and Atmosphere and NOAA Administrator: "Throughout her career, Nancy Foster brought a sense of dedication and commitment to ocean and fishery issues that is matched by few. She tempered her deep expertise and strong management skills with a wry sense of humor, making her a wonderful person to work with. Her death is a great loss for us and for her family and friends. But her accomplishments, ideas and plans abound in NOAA today, and this will be her legacy. We have all benefitted and grown by knowing Nancy, and are the better for it."

Who can say where the spirit may wander before reaching eternity? One NOAA employee in Hawaii had a dream in which she encountered Nancy Foster in Honolulu, sitting on a park bench looking fit and quite happy. That same night, Nancy died, released from her earthly bonds but not from our memories.

Ocean Exploration

continued from page 3 explore the Davidson Seamount off California, the deep sea vents in the Gulf of Mexico off Florida and the Hudson Canyon off New York and New Jersey.

"In each exploration," the President said, "researchers will use cutting-edge deep-sea diving technologies and share their discoveries with schools and the public through the Internet."

The President called on the Commerce Department to convene a panel of scientists, explorers and educators to formulate a national ocean exploration strategy for the future.

The panel, which will report back to the President by mid-October, is to develop a plan that defines objectives and priorities, notes important scientific, historic and cultural sites, promotes collaboration with education, research and private-sector organizations and examines the potential for new technologies. The panel will also ensure that newly discovered organisms with medicinal or commercial potential are identified for possible research and development and will coordinate research with the newly established Marine Protected Area Center.

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